PATENT
Attorney Docket No. 07040.0265-00

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re National Stage of International Application No. PCT/EP00/06357 under 35 U.S.C. § 371 of:	
Maurizio BOICCHI, et al.	Group Art Unit: 1791
Application No.: 10/585,068	Examiner: J. Fischer
§ 371 Date: June 7, 2007	Confirmation No.: 7932
PCT Filing Date: December 30, 2003	**Mail Stop RCE**
For: TIRE FOR VEHICLES	

Mail Stop RCE
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450
Sir:

DECLARATION UNDER 37 C.F.R. § 1.132

I, Pierluigi De Cancellis, declare and state that:

1. I am an Italian citizen, residing at Milan, Italy.

2. I was awarded a University Degree in Chemical Engineering by Politecnico di Milano, in April 18th 1994.

3. I have been employed by Pirelli Tyre, S.p.A. ("PIRELLI") since September 1st 1994. During my employment at PIRELLI, I have been engaged in the research and development of Tyre Materials. In particular, I have worked as Compound engineer.

4. Given my education and experience, particularly in the area of automotive tires and their compositions, I consider myself able to provide the following testimony.

5. I was asked to replicate the rubber compositions A to E from Table 1 of Japanese patent No. 02-249707 to Ohashi. The rubber compositions were prepared and tested under my supervision.

6. The ingredients and their amounts for rubber compositions A to E are reported below in Table 1. Due to availability issues, equivalents were identified for certain ingredients reported in Ohashi: butadiene rubber (BR-40 for BR01), carbon black (N-220 for ISAF), and vulcanization accelerator (N-t-butyl-2-benzothiazyl-sulfenamide (TBBS) for N-oxydiethylbenzothiazyl-2-sulfenamide (Nobs)). Based on my experience, it is my opinion that the substitution of these equivalents should not have affected the reported test results.

Table 1: RUBBER COMPOSITION FORMULATIONS FOR EMBODIMENTS A-E

Ingredients	A	B	C	D	E
Natural Rubber (STR-20)	100	100	70	55	40
Butadiene rubber (BR-40)	-	-	30	-	-
Styrene-butadiene rubber (SBR-1500)	-	-	-	45	60
Carbon black (N-220)	45	50	55	50	55
Stearic acid	2	2	2	2	2
Anti-ageing agent (Santoflex 13)	1.25	1.25	1.25	1.25	1.25
ZnO	3	3	3	3	3
Sulfur	1.3	1.5	1.5	1.0	1.1
Vulcanization accelerator (TBBS)	1.1	1.1	1.1	1.1	1.3

- TBBS = N-t-butyl-2-benzothiazyl-sulfenamide. Available on the market with the trade name of VULKACIT®NZ (BAYER)

7. Since Ohashi did not disclose the vulcanization parameters, samples of the embodiments A to E were vulcanized according to two different vulcanization cycles. One set of conditions was designed for Ultra-high performance (UHP) tires (30 minutes at 151°C) and the other set of conditions for non-UHP tires (10 minutes at 170°C). The samples from the UHP vulcanization cycle are designated as A1 to E1 and the samples from the non-UHP vulcanization cycle are designated as A2 to E2.

8. Samples A1 to E1 and A2 to E2 were subjected to the same sets of tests under the same conditions. For each sample, IRHD hardness was measured at both 23ºC and at 100ºC in accordance with ISO standard 48. In addition, for each sample, modulus of elasticity (E') under compression (dynamic data @ 100 Hz) was measured (MPa) at 23ºC and at 100ºC in accordance with the procedure reported at page 3, lines 27-33 of U.S. Patent Application No. 10/585,068. The results of these tests are reported in Table 2

Table 2: MODULUS UNDER COMPRESS AND HARDNESS VALUES

Experiment	A1	B1	C1	D1	E1	A2	B2	C2	D2	E2
	UHP samples					Non-UHP samples				
IRHD (23ºC)	67.9	72.2	74.7	67.9	72.6	64.9	70.4	72.8	65.7	65.4
IRHD (100ºC)	61.0	65.7	70.1	60.9	65.5	58.1	57.1	67.5	58.4	62.8
E^1 (23ºC)	5.31	6.70	7.96	7.98	9.82	5.58	7.03	8.69	8.79	11.33
E^1 (100ºC)	4.55	5.67	6.98	5.52	6.57	4.45	5.47	7.06	5.57	6.86

9. The modulus under compression and hardness ratios for the combinations in Ohashi's Table 2 can be seen in Table 3 below. In Ohashi's Table 2, there are 11 combinations using embodiments A-E for the comparative examples 1-8 in Ohashi and embodiments 1-3 in Ohashi. The modulus under compression and hardness are from the results in Table 2 measured at 100 ºC for both the UHP and non-UHP tires.

Table 3: RATIOS FOR OHASHI TABLE 2 AT 100ºC OF MODULUS UNDER COMPRESSION AND IRHD HARNESS

	C1	C2	C3	E1	E2	C4	E3	C5	C6	C7	C8
Central (first)	B	A	A	B	B	C	C	C	D	D	D
Peripheral (second)	B	C	D	C	D	C	D	E	D	C	E
Ratio:											
IRHD (100º C) UHP	**1.00**	1.15	**1.00**	**1.07**	**0.93**	**1.00**	**0.87**	**0.93**	**1.00**	1.15	**1.07**
E^1 (100ºC) UHP	1.00	**1.53**	1.21	1.23	0.97	1.00	0.79	0.94	1.00	1.26	1.19
IRHD (100º C) non-UHP	**1.00**	1.16	**1.01**	1.18	**1.02**	**1.00**	**0.86**	**0.93**	**1.00**	1.16	**1.08**
E^1 (100ºC) non-UHP	1.00	**1.59**	1.25	1.29	1.02	1.00	0.79	0.97	1.00	1.27	1.23

C = comparison in Ohashi; E = embodiment in Ohashi

10. With respect to IRHD hardness at 100 ºC, I have indicated in bold those samples where the ratio of second material to first material is lower than about 1.10. With respect to modulus of elasticity under compression at 100 ºC, I have indicated in

bold those samples where the ratio of second material to first material is not lower than about 1.30.

11. None of the combinations from Ohashi, whether vulcanized under UHP conditions or non-UHP conditions, have a ratio of second material to first material for IRHD hardness lower than about 1.10, AND have a ratio of second material to first material for modulus of elasticity under compression not lower than about 1.30.

12. I further declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: 24/11/2010

By: _____
Pierluigi De Cancellis

temperatures, such that the claimed ratio would not be expected to deviate significantly from that of room temperature" (office action at 9), has been proven incorrect. While Table 2 of the Declaration shows that modulus does decrease for a given composition, they do not decrease at the same rates. Declaration at ¶ 8. That data yields the following table:

	C1	C2	C3	E1	E2	C4	E3	C5	C6	C7	C8
Central (first)	B	A	A	B	B	C	C	C	D	D	D
Peripheral (second)	B	C	D	C	D	C	D	E	D	C	E
Ratio											
E' (23°C) UHP		1.49	1.50	1.18	1.19		1.00	1.23		1.00	1.23
E' (100°C) UHP		1.53	1.21	1.23	0.97		0.79	0.94		1.26	1.19
E' (23°C) non-UHP		1.56	1.58	1.24	1.25		1.01	1.30		0.99	1.29
E' (100°C) non-UHP		1.59	1.25	1.29	1.02~~1~~		0.79~~8~~	0.97		1.27	1.23

As seen in the above table, many of the Ohashi pairings exhibit significant deviations in their ratios for modulus of elasticity when comparing room temperature versus the claimed temperature of 100 °C. In fact, the relationship between C and E in Comparative 5 and between C and D in Embodiment 3 of both the UHP and non-UHP vulcanization conditions flip when the temperature is raised from room temperature to 100 °C. Also, the relationship between D and B in Embodiment 2 of the UHP vulcanization conditions and between C and D in Comparative 7 of the non-UHP

vulcanization conditions, flip when the temperature is raised from room temperature to 100 °C. Thus, one of ordinary skill in the art could not reasonable reach any conclusion that Ohashi's data may even suggest the compositions could meet the claimed relationship. Further, the relationship has been established not to be inherent to a pair of compositions, irrespective of temperature, as the Office has suggested. Office Action at 9-10.

Further, the Office assertion that there is a relationship between modulus and hardness (Office Action at 10-11) does not hold up under scrutiny. Rather, the experimental tests carried out confirm what is reported in the textbook presently on file (*Manuale della gomma* (Rubber Manual), Tecniche Nuove, Italian edition 1987, first German edition 1981, pp. 231-234) according to which the hardness test can be useful only roughly, but it cannot give sufficient information about the modulus. It certainly cannot be enough to establish as reasonable expectation of success.

Specifically, Applicants observe that, for example, if one considers the absolute values of the modulus of elasticity (E') under compression and of the IHRD hardness at 100°C of the rubber compositions E and B vulcanized according to the conditions for UHP tires, one may note that the rubber compositions E has a greater value of modulus (6.57 vs. 5.67) but, at the same time, has a **lower** value of hardness (65.5 vs. 65.7). *See* Declaration at ¶ 8. By the same token, if one considers the absolute values of the modulus of elasticity (E') under compression and of the IHRD hardness at 100°C of the rubber compositions A and B vulcanized according to the conditions for non-UHP tires, one may note that the rubber compositions B has a far greater value of modulus (5.47 vs. 4.45) but, at the same time, has a **lower** value of hardness (57.1 vs. 58.1). *Id.*